

**CHAIR AND DESK COMBINATION**

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**FIELD OF THE INVENTION**

This invention relates generally to furniture, and, more specifically, to chair and desk combinations.

## **BACKGROUND OF THE INVENTION**

Chair and desk combinations have been known for many, many years, especially as student seating in classrooms.

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Unfortunately, most chair and desk combinations of the prior art subscribe to the "one size fits all" theory of construction. Most prior art chair and desk combinations make little or no attempt to accommodate users of differing heights and girths. Accordingly, the chairs in all known prior art chair and desk combinations are either difficult to get into and get  
10 out of, are too high, are too low, are too close to the desk surface or too far away from the desk surface for a variety of typical users.

Also, in this age of lap top computers, it is increasingly important that the desk top portions of chair and desk combinations be sufficiently large to retain both a lap top  
15 computer and an open textbook or notepad. Chair and desk combinations of the prior art typically have a chair portion which cannot be swivelled to the left or to the right. This deficiency of chair and desk combinations of the prior art can lead to student discomfort and fatigue from having to sit partially sideways in the chair to use the lap top computer on one side of the desk top and to use a textbook or notepad on the other side of the desk top.

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Accordingly, there is a need for a desk and chair combination which avoids these problems in the prior art in a simple and inexpensive manner.

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## **SUMMARY**

The invention satisfies this need. The invention is a chair and desk combination comprising a base, a chair attached to the base and a work surface attached to the base. In one

embodiment, the height of the seating surface is vertically adjustable. In another embodiment, the chair is capable of swiveling about a vertical axis. In yet another embodiment of the invention, the distance between the forward edge of the seating surface and the rearward edge of the work surface is laterally adjustable.

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### DRAWINGS

These features, aspects and advantages of the present invention will become  
10 better understood with regard to the following description, appended claims and accompanying figures where:

Figure 1 is a first perspective view of a chair and desk combination having  
15 features of the invention;

Figure 2 is a second perspective view of the combination illustrated in Figure 1;

Figure 3 is a plan view of the combination illustrated in Figure 1;

20 Figure 4 is a bottom view of the combination illustrated in Figure 1;

Figure 5 is a side view of the combination illustrated in Figure 1;

25 Figure 6 is a perspective view of a second chair and desk combination having a first alternative structure attached to the underside of the desk;

Figure 7 is a bottom view of the combination illustrated in Figure 6;

Figure 8 is a perspective detail view showing a third alternative structure attached to the underside of the desk top;

Figure 9 is a cross-sectional detail view taken along line 9-9 in Figure 8;

Figure 10 is a perspective detail view showing a fourth alternative structure attached to the underside of the desk top;

Figure 11 is a cross-sectional detail view taken along line 11-11 in Figure 10;

Figure 12 is a perspective detail view showing a fifth alternative structure attached to the underside of the desk top;

Figure 13 is a cross-sectional detail view taken along line 13-13 in Figure 12;

and

Figure 14 is a cross-sectional detail view of an alternative embodiment to that which is illustrated in Figure 13.

#### **DETAILED DESCRIPTION**

The following discussion describes in detail one embodiment of the invention and several variations of that embodiment. This discussion should not be construed, however, as limiting the invention to those particular embodiments. Practitioners skilled in the art will recognize numerous other embodiments as well.

The invention is a chair and desk combination **10** comprising a base **12**, a chair **14** having a seating surface **16** with a forward edge **18** and a work surface **20** having a rearward edge **22**. In one embodiment of the invention, the height of the seating surface **16** is vertically adjustable. In another embodiment of the invention, the seating surface **16** is capable of swiveling about a vertical axis and the distance between the forward edge **18** of the seating surface **16** is laterally adjustable with respect to the rearward edge **22** of the work surface **20**.

In the embodiments illustrated in the drawings, the base **12** comprises a pair of generally parallel horizontal rails **24**. Bases **12** having other shapes can also be used. In the embodiments illustrated in the drawings, the pair of horizontal rails **24** are constructed from tubular steel. In a typical embodiment, the tubular steel has a nominal diameter of 1 1/4 inches and a tube wall thickness of 0.098 mils.

As can be seen from the drawings, one or more transverse members **26** are typically used to retain the pair of horizontal rails **24** in a stable and fixed relationship to one another. In the embodiments illustrated in the drawings, the transverse member **26** at the rear of the combination **10** also provides an enclosed area for the user to store books, notepads, a backpack, etc.

The chair **14** can be any chair suitable for comfortably retaining a user of the combination **10**. In a typical embodiment, the chair also comprises a chair back **28**.

In the embodiment illustrated in the drawings, the chair **14** is attached to the base **12** by a single vertical strut **30** and a chair attachment cross member **32**. The chair attachment cross member **32** is welded at its respective ends to one of the pair of horizontal rails **24** of the base **12**.

In a preferred embodiment, the chair **14** is vertically adjustable as illustrated in Figure 5. Typically, this is achieved by providing the vertical strut **30** with an adjustable telescoping mechanism **34**. The adjustable telescoping method **34** can comprise a mechanical screw that raises or lowers the seat by spinning the seat similar to an old fashioned piano stool.

5 More typically, such telescoping mechanisms **34** are provided with springs or a gas cylinder, together with suitable spring stops or valves to allow for the vertical adjustment of the seating surface **16**. Such telescoping mechanisms **34** in the vertical strut **30** are well-known to those in the art. In the embodiment illustrated in the drawings, the vertical strut **30** comprises an internal air cylinder, internal valve and valve opening lever **36**. Such a vertical strut **30**

10 provides an efficient and easily operated mechanism for vertically adjusting the height of the seating surface **16**.

It is also preferred that the seating surface **16** of the chair **14** be capable of swiveling about a vertical axis as illustrated in Figure 3. Typically, the seating surface **16** is

15 capable of swiveling about a vertical axis through an arc of at least 15°. This feature allows a user to easily enter and exit from the chair **14**. This feature also allows the user to alternatively rotate the seat to the left to use the left portion of the work surface **20** or to the right to use the right portion of the work surface **20**. This is a very important ergonomic feature which reduces discomfort and fatigue in the body of the user.

20 The work surface **20** provides a desk top for use by the user of the combination **10**. The work surface **20** is disposed upon a substrate **38**. The work surface **20** defines a work surface area of between about 80 square inches and about 1100 square inches. In the embodiments illustrated in the drawings, the work surface **20** is attached to the base **12** by a

25 pair of generally parallel riser rails **40**. Other methods of attaching the work surface **20** to the base **12** can also be used. In the embodiments illustrated in the drawings, the pair of riser rails **40** are typically made from tubular steel. In a typical embodiment, the diameter and thickness of the tubular steel used to manufacture the pair of riser rails **40** are similar or identical to the

diameter and thickness of the tubular steel used to manufacture the pair of horizontal rails **24** of the base **12**.

In the embodiments illustrated in the drawings, each horizontal rail **24** in the  
5 base **12** has a forward end **42** and a rearward end **44**, and each of the riser rails **40** has an upper portion **46** and a lowermost end **48**. The forward end **42** of each horizontal rail **24** is attached to the lowermost end **48** of one of the riser rails **40**.

Preferably, the distance between the forward edge **18** of the seating surface **16** is  
10 laterally adjustable with respect to the rearward edge **22** of the work surface **20** as illustrated in Figure 3. This can be accomplished by fixing either the disposition of the chair **14** or the work surface **20** with respect to the base **12** and allowing the other of the chair **14** or work surface **20** to be moveable. In the embodiments illustrated in the drawings, the chair **14** is laterally fixed and the work surface **20** is laterally adjustable.

15 The adjustability of the rearward edge **22** of the work surface **20** with respect to the forward edge **18** of the seating surface **16** can be accomplished in many different ways. The drawings illustrate several of these ways. Figures 1-11 illustrate a first way. In this first way, the upper portions **46** of the pair of riser rails **40** are disposed generally horizontally and  
20 are attached to a pair of parallel first slide sections **50**. The underside **52** of the substrate **38** is attached to a pair of parallel second slide sections **54**. Each first slide section **50** connects the upper portions **46** of the pair of riser rails **40** to rigidly retain the pair of riser rails **40** in fixed, spaced apart relationship. Additionally, each first slide section **50** cooperates with a second slide section **54**, such that the rearward edge **22** of the work surface **20** can be laterally  
25 adjusted by sliding the work surface **20** forward with respect to the seating surface **16** or by sliding the work surface **20** rearwardly with respect to the seating surface **16**.

In the embodiments illustrated in Figures 1-11, the second slide sections **54** are provided by a pair of longitudinal slide rods **56** and the first slide sections **50** are provided by a pair of transverse rails **58**. Each of the slide rods **56** is disposed within an aperture at one end of both of the transverse rails **58**, such that the slide rods **56** can slide back and forth within the transverse rails **58**. The transverse rails **58** can be welded at their respective ends to the upper portions **46** of the riser rails **40**, and the slide rods **56** can be attached to the underside **52** of the substrate **38** by brackets **60**.

In the embodiments illustrated in Figures 1-7, a reenforcing block **62** is centrally and longitudinally attached to the underside **52** of the substrate **38**. The vertical depth of the reenforcing block **62** is slightly less than the distance between the upper portion of the forward most transverse rail **58** and the underside **52** of the substrate **38**, so that the reenforcing block **62** does not normally contact the forward most transverse rail **58**. The purpose of the reenforcing block **62** is to provide additional resistance to downward forces on the work surface **20** which might otherwise bend the pair of slide rods **56**. In the event that an undue amount of force is applied to the work surface **20**, such as by someone bouncing on the top of the work surface **20**, the downward deflection of the substrate **38** causes the reenforcing block **62** to contact and rest upon the upper portion of the forward most transverse rail **58**, thereby effectively resisting the undue force and preventing damage to the slide rods **56**.

In the embodiment illustrated in Figures 12 and 13, the first slide sections **50** comprise a pair of transverse rails **58** and a dove tail beam cover **64**. The second slide sections **54** comprise a pair of dove tail beams **66** attached to the underside **52** of the substrate **38**. In this embodiment, each dove tail beam **66** is slidably disposed within one of the dove tail covers **64**.



The embodiment illustrated in Figure 14 is similar to the embodiment illustrated in Figures 12 and 13. Instead of the pair of dove tail beams 66 attached to the underside 52 of the substrate 38, however, a pair of ball bearing races 68 are attached to the underside 52 of the substrate 38. A plurality of ball bearings 70 are disposed within the races 68 and are retained within the races 68 by a pair of ball bearing race covers 72 attached to transverse rails 58.

In each of the embodiments illustrated in the drawings, the combination further comprises a latch mechanism 74 for preventing the movement of the work surface relative to the seating surface 16. In the embodiments illustrated in Figures 1-7, the latch mechanism 74 is provided by a pair of notched rails 76 disposed within the first slide sections 50. The notched rails 76 have a plurality of notches 78. The second slide sections 54 comprise a latch 80 capable of cooperating with the notches 78 in the notched rails 76 to alternatively (i) fixedly engage the work surface 20 with respect to the base 12 at any one of a plurality of distances from the seating surface 16, and (ii) disengage the work surface 20 from the base 12 so that the work surface 20 can be slid closer to the seating surface 16 or further from the seating surface 16.

The latch 80 can be released from the notched rails 76 by a latch release mechanism 82 which is conveniently disposed immediately below the substrate 38 and proximate to the rearward edge 22 of the work surface 20.

In the embodiment illustrated in Figures 1-5, the notched rails 76 constitute a two-piece block having a pair of notched rails 76 which are independent of one another. In the embodiment illustrated in Figures 6 and 7, the notched rails 76 constitute a one-piece block comprising a pair of notched rails 76 which are attached to one another.

In the embodiment illustrated in Figures 8 and 9, the latch mechanism 74 is provided by a set screw 84. The set screw 84 is disposed within one of the transverse rails 58. The set screw 84 is disposed through the transverse rail 58 and is capable of engaging one of the slide rods 56. The use of such a set screw 84 provides the ability to adjust the work surface 20 a distance from the seating surface 16 at an infinite number of distances.

In the embodiment illustrated in Figures 10 and 11, the latch mechanism 74 is provided by a locking pin 86 and a notched plate 88. The notched plate 88 is attached to the underside 52 of the substrate 38. The notches 90 in the notched plate 88 can be recesses, as illustrated in the drawings, or they can be ridges. The locking pin 86 is disposed within one of the transverse rails 58. Typically, the locking pin 86 is biased towards engagement with the notched plate 88, such as by a biasing spring 92.

Preferably, the combination further comprises a cover 94 mounted on the underside 52 of the substrate 38 to cover the slide sections 50 and 54 and latch mechanism 74. Such a cover 94 is depicted in cut-away fashion in the embodiments illustrated in Figures 1-7. The cover 94 protects the user from contacting the slide sections 50 and 54, brackets 60 and/or latch mechanism 74, and adds to the overall aesthetics of the combination 10.

The invention provides a desk and chair combination vastly superior to those of the prior art. Because of the vertical adjustability of the chair, the ability of the chair to swivel and the ability of the desk top to be longitudinally adjustable, the desk and chair combination of the invention avoids the "one size fits all" problems of the prior art.

Having thus described the invention, it should be apparent that numerous structural modifications and adaptations may be resorted to without departing from the scope and fair meaning of the instant invention as set forth hereinabove.